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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Mehmet Arik

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EXAMINER

HAN, JASON

ART UNIT

PAPER NUMBER

2875

DATE MAILED: 07/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/726,882		ARIK ET AL.	
	Examiner		Art Unit	
	Jason M. Han		2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
 - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
 - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16,28-31 and 34-37 is/are rejected.
- 7) ☒ Claim(s) 17-27,32 and 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Pages 7-9, filed April 27, 2006, with respect to the rejection(s) of Claim(s) 1-33 under 35 U.S.C. 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Ignatius et al. (U.S. Patent 5,278,432).

2. Applicant's arguments concerning Claims 34-35, see Pages 9-10 filed April 27, 2006, have been fully considered but they are not persuasive.

Applicant's first argument is concerned with the nature of combining the prior art of Belliveau (U.S. Patent 6,357,983) in view of Glezer et al. (U.S. Patent 6,588,497), arguing that, "the magnetic-based fan motor clearly indicates that Glezer et al. were discussing the deficiencies of using a rotary fan, which is the same type of fan that is taught by Belliveau, to cool objects. After considering both the references as a whole, one skilled in the art would not simply replace the fan discussed in Belliveau with a synthetic jet disclosed in Glezer et al." [Page 9]. However, the abovementioned deficiency of using the rotary fan was the primary motivation for combining Belliveau with Glezer. To recapitulate the Office Action filed on February 2, 2006, "It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Belliveau to incorporate the synthetic jet actuator of Glezer aimed at the LED in order to provide a cooling means for the lamp without the use of a fan, which typically produces loud noises" [Page 9; underline added for emphasis].

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Applicant's second argument concerning "the control of the vortices being very difficult" is insubstantial, since the Examiner believes that the obviousness is not nullified due to the difficult nature of airflow/fluid dynamics. The Examiner maintains that it would have been obvious to one ordinarily skilled in the art to modify the lamp assembly of Belliveau to incorporate the synthetic jet actuator of Glezer, understanding that the nature of the fluid dynamics would be altered and would require necessary adjustments within the apparatus, which is feasible despite complexity.

The following claims were rejected in light of the specification, but rendered the broadest interpretation as construed by the Examiner and as stated by the Applicant within the context of the claim language [MPEP 2111].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-16 and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ignatius et al. (U.S. Patent 5,278,432) in view of Tanuma et al. (U.S. Patent 5,008,582).
4. With regard to Claims 1-2, Ignatius discloses an LED lighting assembly including:
 - A housing [Figures 4-5: (28)];

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- An LED [Figures 2-5: (10, 14)] disposed in said housing;
- A heat dissipating structure [Figures 4-5: (36, 38)] in thermal communication with said LED; and
- A fluid current generator [Figures 4-5: (40)] disposed in said housing for creating current over said heat dissipating structure.

Ignatius does not specifically teach the fluid current generator including a piezoelectric material (re: Claim 1), nor specifically teaches the structural details of the fluid current generator including a blade comprising a flexible material, wherein the blade is spaced from a surface of the heat dissipating structure such that an unattached end of the blade can move in relation to the surface (re: Claim 2).

Tanuma teaches, "In an electric device having a package including-[ed] an electric circuit element therein, a cooling fan is fixed on the package directly. The fan is formed of piezoelectric elements and a flexible cooling fin. The fan generates the cooling air flow due to vibration of the piezoelectric elements [Abstract]." In addition, Tanuma teaches the cooling fan including a blade [Figure 18: (21)] of flexible material, wherein the blade is spaced from a surface [Figure 18: (40)] of a heat dissipating structure [Figure 18: (11, 40, 41)] such that an unattached end of the blade can move in relation to the surface.

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Ignatius with the cooling system/fluid current generator of Tanuma in order to ensure conditions [e.g., cooled surface] for efficient illumination of the light emitting diode [see Tanuma: Description of the Prior

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Art], whereby the piezoelectric fan produces a sufficient airflow without the noise commonly associated with motor fans.

5. With regards to Claim 3, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a pedestal [Figure 21: (28)] extending from the surface of the heat dissipating structure [Figure 21: (11, 40)], wherein the blade is attached to the pedestal such that the blade is spaced from the surface [Figure 19].

6. With regards to Claim 4, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal having a width at least equal to the width of the blade [Figure 20].

7. With regards to Claim 5, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal preventing axial current flow between the blade and the surface at an end of the blade that attaches to the pedestal [Figure 18: obvious by disposition].

8. With regards to Claim 6, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a piezoelectric material [Figure 5: (20)] running at least substantially the length of the blade [Figure 5: (19)].

9. With regards to Claim 7, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a plurality of fins [Figure 25: (40)] extending from the surface of a heat dissipating structure [Figure 25: (11)].

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10. With regards to Claim 8, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a pedestal [Figure 27: (28)] extending from the surface, wherein the blade mounts to the pedestal.

11. With regards to Claim 9, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal [Figure 27: (28)] being spaced from the plurality of fins [Figure 27: (40)] to define a gap between the plurality of fins and the pedestal.

12. With regards to Claim 10, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the pedestal preventing axial current flow between the blade and the surface at an end of the blade that attaches to the pedestal [Figure 18: obvious by disposition].

13. With regards to Claim 11, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the heat dissipating structure [Figure 25: (11)] including a cavity [Figures 25&27: between (28) and (40)] defining an opening, whereby the cooling fan includes a blade [Figures 25&27: (19)] that covers a portion of the opening.

14. With regards to Claim 12, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the cavity being defined by an end wall that impedes axial current flow [Figures 25&27: (40)].

15. With regards to Claim 13, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma [Description of the Prior Art] teach a heat dissipating structure including a printed circuit board.

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16. With regards to Claim 14, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches a blade [Figure 25: (19)] having a flexible material [Figure 25: (21)] attached to a piezoelectric material [Figure 25: (20)], wherein the flexible material is substantially the same length as the piezoelectric material.

17. With regards to Claim 15, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the heat dissipating structure including a flow path surface [Figure 27: left side of (28) and (40)] defining the opening and the blade mounting substantially flush with the surface.

18. With regards to Claim 16, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, it is obvious that due to the disposition of the blade [Figure 27: (21)] and the cavity [Figure 27: between (28) and (40)] that the fluid current generator would produce a vortex shaped current around the flow path surface. It should further be noted that it has been held that the recitation that an element is "adapted to" perform a function is not a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense. *In re Hutchison*, 69 USPQ 138.

With regards to Claim 28, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Ignatius teaches a plurality of fins [Figure 5: (38)] extending from the heat dissipating structure.

19. With regards to Claim 29, Ignatius in view of Tanuma discloses the claimed invention as cited above, but does not specifically teach said fins radiating from a

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central point of said heat dissipating structure. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to position the fins to radiate from a central point of said heat dissipating structure, since it has been held that rearranging parts of an invention involves only routine skill in the art. *In re Japiske*, 86 USPQ 70. In this case, it is obvious that one would want to optimize heat transfer, whereby extending the fins radially outward from a central point ensures the heat may transfer towards an outside position closer to the housing.

20. With regards to Claim 30, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Ignatius teaches the fluid current generator [Figure 5: (40)] being positioned adjacent the central point of said heat dissipating structure [Figure 5: (36, 38)]. It is also obvious that one would want to position said generator at or adjacent to the heat dissipating structure so as to ensure appropriate airflow across thereof.

21. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ignatius et al. (U.S. Patent 5,278,432) in view of Tanuma et al. (U.S. Patent 5,008,582) as applied to Claim 28 above, and further in view of Edelman et al. (U.S. Patent 4,501,319).

Ignatius in view of Tanuma discloses the claimed invention as cited above, but does not specifically teach the structural details of the fluid current generator including a plurality of openings for creating a plurality of fluid currents.

Edelman discloses a piezoelectric polymer heat exchanger having multiple flexible plates [Figure 3A: (20)] being connected by a rectangular housing/hinge [Figure

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3A: (10)]. In addition, Edelman teaches a fluid current generator with a plurality of openings [Figures 3A-3B].

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Ignatius in view of Tanuma to incorporate the plurality of openings for creating a plurality of fluid currents, as principally taught by Edelman, so as to alter the fluid dynamics and provide greater control via multiple currents in cooling the assembly.

22. Claims 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belliveau (U.S. Patent 6357893) in view of Glezer et al. (U.S. Patent 6588497).

Belliveau discloses an LED lighting assembly including:

- A housing [Figure 12C: (970)];
- An LED/plurality of LEDs [Figure 12C: (912a)] disposed in said housing;
- A heat dissipating structure [Figure 12C: (912)] in thermal communication with said LED/plurality of LEDs (inherent given the electrical connections); and
- A fluid current generator [Figure 12C: (2270)] disposed in said housing for creating current over said heat dissipating structure.

Belliveau does not specifically teach the structural details of the fluid current generator being a synthetic jet actuator disposed in the housing, which is aimed to provide a current of fluid for the LED/plurality of LEDs.

Glezer teaches a thermal management system utilizing a synthetic jet actuator for cooling the system [Abstract].

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Belliveau to incorporate the synthetic jet actuator of Glezer aimed at the LED in order to provide a cooling means for the lamp without the use of a fan, which typically produces loud noises. To quote Glezer, "Traditionally, the need for cooling microelectronic devices has been met by using forced convective cooling with or without heat sink devices. Forced convection is effected using fans which provide either global overall cooling or locally-based cooling... Use of a fan also requires relatively large moving parts in order to have any success in cooling a heated body or microelectric component. These large moving parts naturally require high power inputs [Column 1, Lines 39-49]."

It should further be noted that Belliveau teaches, "Ventilation holes are strategically placed in the substrate as to provide airflow either by a forced air system or by convection and to assist in dissipation of unwanted heat that is generated by the light sources and increase the life of the light sources" [Column 3, Lines 15-19]. It is therefore obvious that one could easily implement the synthetic jet actuator of Glezer as a forced air system into the lamp assembly of Belliveau.

23. Claims 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ignatius et al. (U.S. Patent 5,278,432) in view of Tanuma et al. (U.S. Patent 5,008,582).

24. With regards to Claim 36, Ignatius discloses an LED lighting assembly including:

- A heat sink [Figures 4-5: (36, 38)];
- A support [Figures 1-5: (16)]

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- An LED [Figures 2-5: (10, 14)] mounted to said support, whereby the LED conducts heat through the support and into the heat sink; and
- A fluid current generator [Figures 4-5: (40)] disposed for creating current over heat sink.

Ignatius does not specifically teach the fluid current generator including a piezoelectric material.

Tanuma teaches, "In an electric device having a package including-[ed] an electric circuit element therein, a cooling fan is fixed on the package directly. The fan is formed of piezoelectric elements and a flexible cooling fin. The fan generates the cooling air flow due to vibration of the piezoelectric elements [Abstract]." In addition, Tanuma teaches the cooling fan including a blade [Figure 18: (21)] of flexible material, wherein the blade is spaced from a surface [Figure 18: (40)] of a heat dissipating structure [Figure 18: (11, 40, 41)] such that an unattached end of the blade can move in relation to the surface.

It would have been obvious to one ordinarily skilled in the art at the time of invention to modify the LED lamp assembly of Ignatius with the cooling system/fluid current generator of Tanuma in order to ensure conditions [e.g., cooled surface] for efficient illumination of the light emitting diode [see Tanuma: Description of the Prior Art], whereby the piezoelectric fan produces a sufficient airflow without the noise commonly associated with motor fans.

25. With regards to Claim 37, Ignatius in view of Tanuma discloses the claimed invention as cited above. In addition, Tanuma teaches the heat sink [Figure 5: (36)]

including a first surface [Figure 5: adjacent (10)] to which the support [Figures 1-5: (16)] attaches and a second surface [Figure 5: (38)] that is spaced from the first surface, wherein the fluid current generator [Figure 5: (40)] is disposed for creating a current over the second surface.

Allowable Subject Matter

26. Claims 17-25, 26-27, 32, and 33 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: With regard to Dependent Claims 17, 26, 32, and 33, the Applicant commonly recites the fluid current generator including a first and second side plate being connected by a flexible hinge. The prior art of record fails to teach or suggest the combination of structural elements, specifically the abovementioned details of the fluid current generator, claimed herein, and all subsequent dependent claims are allowed.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M. Han whose telephone number is (571) 272-2207. The examiner can normally be reached on 8:00am-5:00pm.

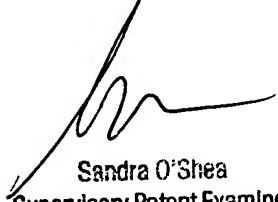
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Jason M Han
Examiner
Art Unit 2875

JMH (7/14/2006)



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